



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/896,346	06/28/2001	Sailesh Kottapalli	42390P11314	8329

7590 03/01/2004

Leo V. Novakoski  
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP  
12400 Wilshire Boulevard, Seventh Floor  
Los Angeles, CA 90025-1026

EXAMINER

KIM, KENNETH S

ART UNIT

PAPER NUMBER

2111

DATE MAILED: 03/01/2004

5

Please find below and/or attached an Office communication concerning this application or proceeding.

SM

## Office Action Summary

**Application No.**

09/896,346

**Applicant(s)**

KOTTAPALLI ET AL.

**Examiner**

Kenneth S KIM

**Art Unit**

2111

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.


- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 20 June 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

  
KENNETH S. KIM  
PRIMARY EXAMINER

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_.

Art Unit: 2111

1. Claims 1-26 are presented for examination.

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

(a) Claims 1, 10, and 18, it is not clear what is the use of the blocks stored in the temporary instruction cache.

(b) Claim 23, it is not clear what is the use of the second portion stored in the temporary storage.

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claim 10 is rejected under 35 U.S.C. 102(b) as being anticipated by Grochowski et al, U.S. Patent No. 5,442,756.

Grochowski et al teaches the invention as claimed in claim 10 including an instruction fetch engine comprising:

(a) an instruction cache to provide a line of instructions in response to an instruction pointer (204; col. 12, line 51),

(b) an instruction queue to receive a first block of the instruction line during a first clock interval (63a; col. 12, line 62), and

(c) a temporary instruction cache to receive a second block of the instruction line during the first clock interval (63b; col. 12, lines 55 and 64).

6. Claims 10 and 11 are rejected under 35 U.S.C. 102(e) as being anticipated by Phillips et al, U.S. Patent No. 6,237,074.

Phillips et al teaches the invention as claimed in claim 10 including an instruction fetch engine comprising:

(a) an instruction cache to provide a line of instructions in response to an instruction pointer (16; col. 8, line 43),

(b) an instruction queue to receive a first block of the instruction line during a first clock interval (612; col. 8, line 44),,

(c) a temporary instruction cache to receive a second block of the instruction line during the first clock interval (14; col. 8, lines 47-51), and

(d) wherein the temporary instruction cache provides the second block of the instruction line to the instruction queue in a subsequent clock interval (col. 9, line 42) – claim 11.

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1, 2, 8, 12, 13, 15, and 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grochowski et al, U.S. Patent No. 5,442,756 in view of Dowling, U.S. Patent No. 6,170,051.

Grochowski et al teaches the invention substantially as claimed in claim 1 including the cache, instruction queue, and temporary instruction cache as set forth in paragraph 3 above, however, does not expressly state that an arbiter to provided to have an instruction pointer (IP) from a plurality of IPs, each associated with an instruction thread, to address the cache in alternate cycles to provide instructions to respective instruction queues.

Dowling teaches the use of an arbiter (610) to provide an IP from a plurality of IPs (600, 601, 602) to address the cache.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made that the method of providing instructions from cache addressed by an IP, via the instruction queue and the temporary instruction cache, can be applied to any number of IPs to, and the person would have been motivated to apply the method to a plurality of IPs to provide a concurrent multithread operation as an enhancement in versatility.

It would also have been obvious that the selection of instructions for different threads in alternate clock intervals and the provision of separate instruction queues are well known in the art and one would have been motivated to incorporate such well known features to further enhance the versatility (see Background section of the present specification and Dubey et al).

9. Claims 3-5, 7, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Phillips et al, U.S. Patent No. 6,237,074 in view of Dowling, U.S. Patent No. 6,170,051.

Phillips et al teaches the invention substantially as claimed in claim 3 including the cache, instruction queue, and temporary instruction cache as set forth in paragraph 4 above, however, does not expressly state that an arbiter is provided to have an instruction pointer (IP) from a plurality of IPs, each associated with an instruction thread, to address the cache in alternate cycles to provide instructions to respective instruction queues.

Dowling teaches the use of an arbiter (610) to provide an IP from a plurality of IPs (600, 601, 602) to address the cache.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made that the method of providing instructions from cache addressed by an IP, via the instruction queue and the temporary instruction cache, can be applied to any number of IPs to, and the person would have been motivated to apply the method to a plurality of IPs to provide a concurrent multithread operation as an enhancement in versatility.

It would also have been obvious that the selection of instructions for different threads in alternate clock intervals and the provision of separate instruction queues are well known in the art and one would have been motivated to incorporate such well known features to further enhance the versatility (see Background section of the present specification and Dubey et al).

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Reininger et al taught a method of providing portions of an instruction cache line to two instruction queues.

Laakso et al taught a method of using a secondary cache to load the instruction buffer and the primary cache.

Dubey et al taught a method of providing instructions from a cache to a plurality of thread instruction buffers.

11. Claims 6, 9, 14, 16, 17, 19-22 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

The claims would be allowable over the prior art of record for the references do not teach the use of a temporary instruction cache for storing second blocks of instructions of different thread cache lines in alternate clock intervals to forward to the instruction queue in the subsequent clock intervals.

Art Unit: 2111

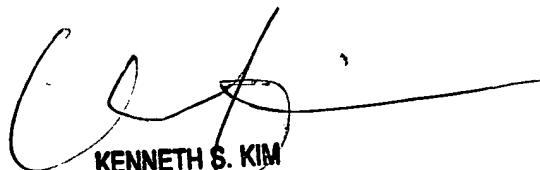
12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kenneth S KIM whose telephone number is (703) 305-9693. The examiner can normally be reached on M-F (8:30-17:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Rinehart can be reached on (703) 305-4815. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and (703) 872-9306 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

\*\*\*

February 25, 2004



KENNETH S. KIM  
PRIMARY EXAMINER